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3. In addition to those Anura and Urodeles named by Patzelt and Kubik, there are no acidophilous cells in the adrenals of *Spelerpes bilineatus, Plethodon glutinosus* and *Acris gryllus.*

4. The presence of acidophilous cells in the adrenals of *R. esculenta, R. pipiens* and *R. clamata* suggests that probably these species are more nearly related to each other than they are to other amphibians which do not have the acidophilous cells in the adrenals. It further suggests that certain physiological activities of these three species are very similar if not exactly alike.

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TECHNIC FOR CESTODES

LaRue (Ill. Biol. Monog. Vol. 1: Nos. 1 and 2, 1915) gives the following account of methods of treating Cestodes:

The following methods have been used by the writer in the work on this group of cestodes. To a large extent they may be used with success on all groups of cestodes, although it should be understood that certain methods which give admirable results with the relatively small and thin cestodes here dealt with will not give equally good results if used on the large forms such as Tænia.

The larger forms were picked out of the intestinal contents, care being taken to free the head if the worm was attached to the mucosa. These were then repeatedly dipped in the killing solution until the worm ceased to contract. The worm was allowed to lie for 15 minutes to 2 hours in the same fluid. Metallic instruments are to be avoided if corrosive sublimate solutions are used for fix-

ation. When the smaller worms were encountered the whole intestine slit open was placed in a small quantity of physiological saline solution in a bottle which was then shaken vigorously for about 3 minutes, the killing fluid was added, and the whole then shaken for one half minute. This is according to the method of Looss. The fixative was permitted to act 3 to 10 hours.

The killing fluids used were hot 5% solution of formaldehyde, and hot or cold saturated aqueous solution of corrosive sublimate to which was added glacial acetic acid to make 1 to 2%. Some other fluids were tried but nothing gave better results for the purposes of this study than the corrosive acetic mixture used hot or cold. For most of the worms the cold solution was preferable to the hot which sometimes gave rise to artifacts if used at too high a temperature. In no cases were the worms stupefied before killing.

The usual methods were used for hardening and dehydrating. Specimens were usually preserved in 85% alcohol after running up through the grades. Sometimes after the corrosive acetic fixation 5% formalin was used for a preservative with uniformly excellent results.

Sections were cut 5 to 10 micra thick for the study of histological detail and 20 micra when grosser morphological details were sought. The sections were stained with hæmatoxylin mixtures, either Delafield's hæmatoxylin or Mayer's hæmalum, and decolorized in the manner approved for these stains. Methods of staining in toto followed by sectioning were used with great success at times. For this purpose Ehrlich's acid hæmatoxylin much diluted with 50% alcohol gave the best results. For a contrast stain eosin in 95% alcohol was used on the sections. Acid fushion also in 95% alcohol was sometimes used effectively.

Preparations in toto were much used and were found to be of great value in mapping out the relationships of the organs of the proglottids. Frequently these methods showed everything to be desired except the histology of the organs. In some cases even histological details were well revealed by these methods. The stains which were tried for staining in toto were Mayer's paracarmine, Grenacher's borax carmine, some alcoholic cochineal mixtures, Mayer's hæmalum, Delafield's hæmatoxylin, and Ehrlich's acid hæma-

toxylin. None of the carmine or cochineal stains were very successful for none of them show the boundaries of cestode structures sharply.

The parenchyma in which the genital organs lie always retained too great an amount of these stains to permit a clear view of the genital organs themselves. The hæmatoxylins, however, usually gave wonderfully clear, sharp pictures of the genital organs. It was at times possible to work out such minute structures as vasa efferentia almost in their entirety from such preparations in toto. The three hæmatoxylin stains were found to be about equally good.

In using these stains it was the practice to dilute the stain with the proper diluent. Relatively large quantities of the diluted stain were used for each lot of material. The stain was permitted to act over night (10 to 15 hours) at room temperature. The excess of the stain was then removed by washing in distilled water and the tissue passed through the grades of alcohol to 70% where it was decolorized rapidly by adding hydrochloric acid to make a 0.5 to 1.0% solution. The object was to remove the stain from the peripheral tissues at a rapid rate and meanwhile leave the stain in the deeper lying tissues. In this method the duration of the acid bath is usually short, depending upon the size of the piece and the character of the stain taken by the tissue, and upon the character of the tissue itself. In general it is desirable to decolorize until a light reddish blue stain remains and until many of the internal structures can be distinguished while the tissue is still in the alcoholic medium. When in the judgment of the operator the proper stain is attained the tissues are placed in neutral alcohol and then into 70% alcohol rendered slightly alkaline by the addition of a few drops of an aqueous solution of sodium carbonate.

Preparations were not flattened but were straightened out on a slide and over this was placed another slide which was supported by strips of paper of such a thickness that little or no pressure was exerted on the specimen by the slides. Dehydration and clearing were accomplished while the preparation was thus kept straight. Xylol and cedarwood oil were used as clearing agents. Preparations were mounted in balsam.

The methods outlined above yielded very satisfactory preparations for the study of these cestodes and they have also been used by the writer on other cestodes and on trematodes with great success. It is noteworthy that the carmine stains give beautiful preparations of trematodes in toto but fail almost entirely for cestodes. For the cestodes these stains fail because they do not sharply and clearly outline the sexual organs as they do in trematodes, though not better than do the hæmatoxylins. In the judgment of the writer the use of the carmine stains on cestode material has been responsible for many errors in the interpretation of cestode structures.

CULTIVATION OF PLASMODIUM OF BADHAMIA

Hilton (Jour. Queck. Micr. Club, Nov. 1914) describes a method which he has found successful for the continuous cultivation of plasmodia of the Myxomycete, *Badhamia utricularis*. He uses bread which is kept moistened with water. He finds that it stimulates the growth of the plasmodium to use from time to time, instead of pure water, a mixture consisting of a quart of water to which has been added half an ounce each of ammonium phosphate and cane sugar. This seems to give greater vigor to the plasmodium itself, and also aids it indirectly in that it stimulates the growth of the filamentous moulds which grow on the bread and are used by the plasmodium. It would be interesting to know whether this method would serve for other species.

DAPHNIA WITHOUT SEXUAL FORMS

Banta (Proc. Soc. Exp. Biol. and Med., 1914, p. 180) has reared *Daphnia pulex* thru one hundred generations without males and fertilization. There is no apparent decrease of vigor or vitality, and thus the sexual cycle seems not to be inherently necessary, altho males have been found in nature at Cold Spring Harbor.

VERTEBRATE EMBRYOLOGY

In this new work on Embryology, Dr. Prentiss undertakes in one volume to give a working account of the development of the chick and the pig, together with a description of the stages of human embryology, histogenesis, and organogenesis. The figures are